March 23, 2000

MEMORANDUM FOR: DISTRIBUTION

FROM: Glenn S. Podonsky, OA-1

SUBJECT: Standards and Criteria for Evaluating DOE Emergency Management Programs

The Office of Independent Oversight and Performance Assurance (OA) has recently been receiving feedback from DOE Headquarters and field elements concerning the standards and criteria used by this office to conduct emergency management oversight evaluations. The purpose of this memorandum and the information provided in the attachment is to clarify what measures are used by OA to evaluate emergency management programs and assess the readiness of site emergency response organizations to respond to potential emergencies. The information presented herein is consistent with the OA-1 and OA-30 Appraisal Process Protocols and the evaluation plans that are provided to sites before an independent oversight evaluation is conducted.

The requirements promulgated in DOE Order 151.1, *Comprehensive Emergency Management System*, are intentionally non-prescriptive due to the wide variety of operations and activities conducted by DOE and its contractors, and the broad range of hazards associated with these operations/activities. The Order requires that site and/or facility emergency management programs be developed commensurate with the hazards present at that particular site/facility. To assist sites and facilities in implementing the Order requirements, DOE has established a comprehensive emergency management guide. Although the direction provided in the guide is not mandatory, it provides needed clarification regarding the intent of the DOE Order 151.1 requirements. The level of detail and the numerous examples presented in the guide make it an ideal "road map" for implementing a comprehensive and effective site emergency management program or for determining whether equivalent implementation approaches meet the intent of the Order requirements.

The draft Volume VI of the guide, *Emergency Management Evaluations*, contains a generic set of performance evaluation criteria for appraising programs and exercises for responding to emergencies involving hazardous materials. Rather than duplicating this information or creating a different set of performance standards, OA relies on the evaluation criteria in this guide to perform its evaluations. Although this volume of the guide is in draft form, it has been available to DOE Headquarters and field elements in various forms since 1992 and in its current form since June 1999. The attachment to this memorandum provides some specific examples of how OA uses this information to

evaluate the adequacy of a program element or attribute that may be addressed only generically in the Order. OA also assigns higher priority to some program attributes than others. This prioritization process is essentially the same as that reflected in section 1.2.5 of Volume VI. That section describes a process for characterizing findings based on whether a finding directly or indirectly impacts the associated emergency management activity. The information provided in the attached examples is not intended to convey guidance as requirements. It is intended to illustrate that a failure to consider the information contained in the guide may result in incomplete or ineffective program implementation. The ultimate conclusion regarding the adequacy of program implementation or exercise performance depends on whether these elements provide reasonable assurance that workers, the public, and the environment will be protected from the consequences of an emergency based on the hazards present at the site or facility.

During the most recent emergency management evaluations, OA has focused on three particular areas: (1) the adequacy of site and facility hazards surveys and assessments as a foundation for all other emergency management program elements, including categorization and classification, notifications and communications, and protective actions; (2) the ability of emergency responders to mount an effective emergency response based upon their training, expertise, and use of site-specific response procedures, particularly within the first hour of an event; and (3) the use of training, drill, and exercise results, responses to actual events, and internal and external assessments as mechanisms for continuous program and performance improvement. The examples provided in the attachment generally reflect these focus areas. One of the methods that OA uses to evaluate the intended outcome of site emergency response plans and procedures is through performance-based testing, which is also promoted by Volume VI of the guide. These testing activities provide information regarding the ability of emergency responders to implement response actions quickly and accurately based on their training and using established site response "tools." These performance tests are planned and conducted with the aid of a site "trusted agent" who can then validate or refute the findings of OA evaluators that are based on observed performance.

Additional information regarding OA emergency management evaluation methods will be forthcoming and will be provided in conjunction with the issuance of a follow-up report on the status of emergency management programs in the DOE complex. If you have any questions regarding this information, please contact me at (301) 903-3777 or Chuck Lewis, Director, Office of Emergency Management Oversight, at (301) 903-1554.

/s/

Glenn S. Podonsky, Director
Office of Independent Oversight
and Performance Assurance

Attachment

Example Applications of DOE Generic Performance-Based Evaluation Criteria to DOE Order 151.1 Requirements

The purpose of this attachment is to provide examples of how the Office of Emergency Management Oversight (OA-30) within the Office of Independent Oversight and Performance Assurance (OA) uses the generic performance-based evaluation criteria contained in the draft Emergency Management Guide (EMG) Volume VI, *Emergency Management Evaluations*, to evaluate site emergency management programs. The examples are intended to illustrate that, because of the non-prescriptive nature of the DOE Order 151.1 requirements, in many cases it is necessary to consult the emergency management guide to fully understand the purpose and intent of the Order requirements and to help in defining the graded approach for a particular site program.

Each example identifies the basic program element being evaluated and the text of the Order pertaining to that element that would be under examination. The example then provides some relevant excerpts (that are not intended to be all inclusive) from the EMG that aid in understanding the intent of the Order requirement, and selected performance criteria from Volume VI that could be used to evaluate whether the requirement has been implemented effectively.

The examples that are provided are generally reflective of the types of program and performance deficiencies that have been repeatedly identified by OA at multiple sites across the DOE complex. Each example indicates the types of weaknesses being identified by OA and concludes with an indication of how those weaknesses adversely impact an emergency response program. Volume VI of the guide also provides a methodology for determining whether a finding directly impacts, contributes to a direct impact, or indirectly impacts the successful accomplishment of a particular emergency management activity. This determination is critical to establishing the relative importance of the finding and for prioritizing corrective actions.

Each example contains the following information:

Program Element: Identifies the basic emergency management program element addressed by the example. The example does not address all requirements pertaining to that element.

Repeated OA Observations: Provides a general overview of the types of program weaknesses identified during OA emergency management evaluations.

DOE Order 151.1 Requirements: Identifies the provisions of DOE Order 151.1 that are applicable to the program element in the example. Although the text provided in this section does not provide all of the Order references to the program element, it is intended to reflect the core of the program element requirements.

Selected Volume VI Evaluation Criteria: Provides a selected subset of evaluation criteria from Volume VI of the guide that could be used to evaluate the requirements identified. Some of the evaluation criteria listed for a particular example may come from the sets of criteria listed for other program elements.

Affected Outcome: Provides an indication of the impact that failing to implement the requirements of the Order and the provisions of the emergency management guide can have on a site's emergency response capability. The type of program impact (direct, contributing to direct, or indirect), which reflects the severity of a finding as described in Volume VI, is also provided.

Program Element: Hazards Assessments (HAs) EXAMPLE 1

Repeated OA Observations: Hazards assessments do not address the full range of potential emergency scenarios. For example, many sites have not quantitatively analyzed transportation events or malevolent acts as part of the hazards assessment process. Most sites also have not established a process to review the hazards assessment prior to significant changes in hazardous material inventories or facility operations. As a result, many hazards assessments are not based on current inventories of hazardous material.

DOE Order 151.1 Requirements:

For hazardous materials in quantities exceeding the thresholds identified in paragraph 1 of chapter IV of the Order, "The release of or loss of control of hazardous materials (radiological and non-radiological) shall be quantitatively analyzed."

"The hazards assessment shall be reviewed at least annually and updated prior to significant changes to the site/facility or hazardous material inventories."

DOE Guide Volume II, Section 3:

"Accident initiators should include causes such as corrosion, manufacturing defects, malfunctioning equipment or control systems, and procedural or human error. External causes that should be considered include impacts of natural phenomena, accidents at nearby facilities, and vehicle or aircraft crashes. High-probability, low-consequence events need to be addressed in facility emergency plans because of their potential impacts on workers in the affected facility and those nearby. Both malevolent acts and 'severe' events should be included in the Hazards Assessment because they represent the upper end of the consequence spectrum, for which prompt recognition and response may be essential to mitigation of both the event and its health and safety consequences."

Selected Volume VI Evaluation Criteria:

P1.11: "A spectrum of potential emergency event/condition scenarios are analyzed in the Hazards Assessment, including all applicable categories of initiating events, such as internal accidents and events, external events, and malevolent acts."

P1.11 c.: "The spectrum of scenarios analyzed includes a broad range of events covering high-probability, low-consequence through low-probability, high-consequence beyond-design-basis events."

P1.8 b.: "Onsite transportation HAs describe the type and quantity of material transported, containers, routes, speeds, and controls exercised."

P1.9: "The hazards assessment is a current, accurate quantitative compilation of hazardous material inventories or maximum quantities associated with a facility."

P1.9 a.: "Reliable and comprehensive methods of hazardous materials identification are used to provide an accurate representation of materials associated with the facility (e.g., walkthroughs, shipping records, local chemical inventory systems)."

P1.9 b.: "Implemented procedures ensure that emergency planners are notified of significant changes in facility inventories, processes, or activities that may affect results of documented hazards assessments."

Affected Outcome: Incident commanders and emergency managers do not have a complete and accurate set of emergency action levels for categorizing and classifying events that can or have caused a hazardous material release at a site. As identified in one of the Volume VI examples, failure to consider or analyze a spectrum of potential emergency events or conditions has a *direct impact* on the planning activity because the hazards survey/hazards assessments serve as the comprehensive planning basis for the emergency management program. A finding such as this would constitute a Deficiency.

Program Element: Protective Actions EXAMPLE 2

Repeated OA Observations: Emergency responders and, in particular, incident commanders do not have well established, unambiguous predetermined protective actions that can be readily implemented within a defined geographical area in a timely manner. Most sites do not have a procedure or guide for formulating and implementing protective actions and have not adequately trained their emergency responders to make these decisions in the absence of preplanned response resources. Some sites have not established methods to readily notify personnel downwind of a release so that they can take the protective measures necessary to prevent potentially serious adverse health effects.

DOE Order 151.1 Requirements:

"Protective actions shall be predetermined for onsite personnel and the public and shall include:

… plans for timely sheltering and/or evacuation of workers; …

… methods for providing timely recommendations to appropriate State, Tribal, or local authorities of protective actions such as sheltering, evacuation, relocation, and food control; and …

… Protective Action Guides and Emergency Response Planning Guidelines, prepared in conformance with DOE-approved guidance applicable to the actual or potential release of hazardous materials to the environment, for use in protective action decision-making."

The contractor shall "ensure immediate mitigative and corrective emergency response actions and appropriate protective actions and protective action recommendations to minimize the consequences of the emergency, protect worker and public health and safety, provide security, and ensure continuance of such actions until the emergency is terminated."

DOE Guide Volume IV, Section 2:

"Hazards assessment results are used to establish preplanned protective actions."

"Determining when protective actions are necessary and where those actions must be implemented is the primary concern when planning protective actions."

"Knowledge of the geographic area includes the identification of all receptors of interest for planning protective actions."

"The effectiveness of sheltering in place versus evacuation for different types of events should be considered in establishing criteria" for evacuation and sheltering.

Selected Volume VI Evaluation Criteria:

P/E9.10: "Associated with a specific event classification, the decision-maker obtains default Protective Actions (PAs) and Protective Actions Recommendations (PARs), for immediate implementation onsite or recommendation for offsite."

P/E12.3: "The notification and implementation of onsite PAs and PARs is made in a timely, efficient, and unambiguous manner, confirmed and monitored by the ERO."

P/E12.12: "Candidate PARs are coordinated with offsite authorities and well-defined geographic areas for sheltering and evacuation, special needs areas or special populations, and evacuation routes are readily available."

Affected Outcome: If predetermined protective actions, geographical areas, and receptors have not been identified ahead of time, emergency responders will be required to determine whether to evacuate or shelter-in-place and the area over which to implement and/or recommend these actions based on an assessment of the consequences (including the hazard released, wind speed, wind direction, time of plume arrival, and location of receptors) *in the midst of the emergency response*. This severely reduces the probability that protective actions will be implemented in a "timely" manner, which is defined in the EMG as "fast enough for response activities to be effective in protecting worker and public health and safety." Failure to establish and clearly define preplanned protective measures has a *direct impact* on response activities since prompt and effective communication and implementation of protective measures is necessary to ensure worker and public safety, and thus constitutes a Deficiency.

Program Element: Notifications and Communications EXAMPLE 3

Repeated OA Observations: Notifications and communications do not contain sufficient specificity for individuals and organizations receiving the notifications to take needed actions. Many communications and notifications have lacked essential information regarding protective actions, meteorology, and the nature of the hazardous materials release. As identified in the previous example, some sites have not established methods to readily notify personnel downwind of a release so that they can take appropriate protective measures. Other sites have not ensured that the notification process conveys emergency information to the correct individual or organization with decision-making authority. Many sites also have been unable to execute initial emergency notifications promptly and accurately in accordance with site-specific procedures.

DOE Order 151.1 Requirement:

"For Operational Emergencies, provisions shall be established for prompt initial notification of workers and emergency response personnel and organizations, including appropriate DOE Elements and other Federal, State, Tribal, and local organizations."

DOE Guide Volume III, Section 4 and Volume IV, Section 2:

"Notifications associated with Operational Emergencies are designed to …

- protect facility and site personnel and emergency workers through promulgation of information necessary to implement accountability and protective actions, such as sheltering, evacuation, and decontamination,"
- "notify cognizant offsite authorities and agencies which have protective action decision-making authority for the emergency to facilitate public notification," and
- "formally document categorizations and classifications, notification times, protective action recommendations, and emergency condition changes."

"Each notification message to offsite authorities concerning the declaration of an emergency or change in emergency condition should restate the protective actions being recommended, even if the recommendation is 'no protective action.' "

Selected Volume VI Evaluation Criteria:

P/E10.2: "Initial oral notification messages are not delayed by the inclusion of event information beyond a minimum set, that includes: Location of the event, and the name, organization, location, and telephone number of the caller; Brief description, date and time of the event; Categorization/classification and time of declaration; Release in progress (yes/no); Recommended protective actions."

P/E10.3: "Follow-up notifications use a pre-arranged and standardized content and format that supports the inclusion of critical information concerning the nature of the event, description and status, key times, classification and release status (as required), meteorology, protective actions, affected facility, notification authority."

P/E10.10 b.: "Building and area alarms or public address (PA) systems are installed to alert facility personnel to emergency conditions."

P/E10.10 c.: "Systems are in place for notification of onsite workers and public present onsite but outside the immediate vicinity of the affected facility."

Affected Outcome: Rapid, accurate, and concise communications to emergency responders, site workers, and the public are necessary in order for those individuals to take appropriate protective measures. In addition, the individual/organization receiving the notification must understand the information being transmitted and the actions expected to be taken or the decisions to be considered based upon that information. Failure to establish adequate notification and communication mechanisms has a *direct impact* on response activities since prompt and effective communication and implementation of protective measures is necessary to ensure worker and public safety. A finding such as this would constitute a Deficiency.

Program Element: Training and Drills EXAMPLE 4

Repeated OA Observations: Many emergency responders do not have the necessary proficiency to execute their time-urgent response duties promptly and accurately. Sites have not established training and drill programs based on an objective assessment of responders' duties and needs, and many have not established minimum training requirements for all Emergency Response Organization (ERO) members. The effectiveness of training, drill, and exercise activities is limited by the informal methods being used to manage feedback from these activities, lack of specificity in training, drill, and exercise evaluation criteria, and the fact that these activities do not realistically evaluate responder decision-making skills.

DOE Order 151.1 Requirements:

A coordinated program of training and drills "shall apply to emergency response personnel and organizations that the site/facility expects to respond to onsite emergencies. Emergency-related information shall be available to offsite response organizations."

"Both initial training and annual refresher training shall be provided for the instruction and qualification of all personnel (i.e., primary and alternate) comprising the emergency response organization."

"Drills shall provide supervised, 'hands-on' training for members of emergency response organizations."

The contractor shall "establish and maintain a system to track and verify correction of findings or lessons learned from training, drills, exercises, and actual responses."

DOE Guide Volume V, Section 4:

"The Emergency Management System Program Administrator should produce and annually update the Training Program Plan to assure that the program is accurate and focused on the site/facility personnel knowledge and performance needs …"

"Training topics should reflect the functional position and responsibilities of the trainee."

"All personnel (primary and alternate) should participate in at least one drill or exercise annually."

"Training should address emergency tasks that require team efforts for response and mitigation as well as general team-building skills."

"Drills should be of sufficient scope, duration, and frequency to ensure adequate training for all elements applicable to a facility."

"Training and drills should conclude with some form of measurement or demonstration that indicates completion of training objectives and achievement of qualification standards."

Selected Volume VI Evaluation Criteria:

P3.9: "Training courses are performance-based, customized to program-specific ERO positions, contain learning objectives, and have testing as a final validation of satisfactory completion."

P3.2 e.: "Matrices for the identification and implementation of required training topics versus ERO positions are developed and maintained."

P3.2 f.: "Standards for successful completion of each training activity and requirements for updating, retraining, and remedial training are established and enforced."

P3.7: "Special team training is conducted for functional groups, in particular those with technical and management team assignments."

P2.12: "ERO staff participation in drills, exercises, and responses to actual events is tracked and documented."

Affected Outcome: Emergency responders who have not been adequately trained or have not been required to demonstrate that they can perform their assigned emergency response functions may not be prepared to take the actions necessary to mitigate the effects of an emergency on workers, the public, or the environment. Failure to adequately prepare emergency responders to execute their required duties in an emergency has a *direct impact* on emergency preparedness and thereby constitutes a Deficiency.

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